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HAIR COSMETIC COMPOSITION

Inventor:	Isamu Nakae 582-27 Ofuka-cho, Chiba-shi
Applicant:	Lion Oil & Fats Co., Ltd. 1-2-22 Yokoami, Sumida-ku, Tokyo
Agents:	Takehiko Suzue, patent attorney, and 2 others

[There are no amendments to this patent.]

Claim

A type of hair cosmetic composition characterized by the fact that it contains 0.1-30 wt% of a polypeptide with an average molecular weight in the range of 2000-30,000, and 0.05-5 wt% cellulose ether containing quaternary nitrogen with the quaternary nitrogen content in the range of 0.5-3.5 wt%.

Detailed explanation of the invention

This invention pertains to a type of hair cosmetic composition which contains a polypeptide and cellulose ether containing quaternary nitrogen as necessary components, and which has an excellent hair cosmetic effect.

Recently, with the popularization of permanent waves, hair coloring, hot color [transliteration], dryers, etc., there is a higher demand for the hair finishing effects of shampoos, hair rinses, hair treatments, and other hair cosmetic products.

For this type of hair cosmetic product, in order to develop the hair finishing effect, an oil-base component, lecithin, lanolin, polypeptide, etc., are added. For the conventional products, however, a satisfactory hair cosmetic effect still cannot be realized for consumers that demand a smooth and pretty finishing effect of the hair.

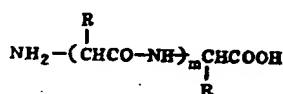
Analysis of the reason indicates that these additives have a weak attraction to the hair, and when they are used separately, the hair cosmetic effect is poor.

In particular, for the hair shampoo containing a large amount of surfactant, the surfactant makes the aforementioned additives flow to the water side. Also, in hair rinses and hair treatments, by means of the coexisting surfactant and water, the aforementioned additives flow away easily when the hair is rinsed.

The present inventors have made efforts in developing a type of hair cosmetic that can meet the recent demand of consumers for excellent hair finishing effects. As a result of this research work, it was found that the desired purpose can be realized by means of a combination mainly of a polypeptide and cellulose ether containing quaternary nitrogen.

That is, this invention provides a type of hair cosmetic composition characterized by the fact that it contains 0.1-30% (wt%, same in the following) of a polypeptide with an average molecular weight in the range of 2000-30,000, and 0.05-5% of cellulose ether containing quaternary nitrogen with a quaternary nitrogen content in the range of 0.5-3.5%.

More specifically, polypeptide as a necessary component is a substance which has both an amino group and carboxyl group represented by following formula. This invention is substantially not related to a specific manufacturing method. However, it is preferred that the polypeptide be prepared as a hydrolysis product of collagen protein from the viewpoint of practical application.



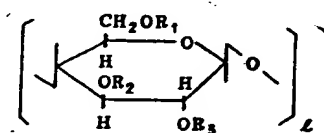
(Where R represents an alkyl group).

However, the average molecular weight of the polypeptide is a substantially important factor, and it should be in the range of 2000-30,000.

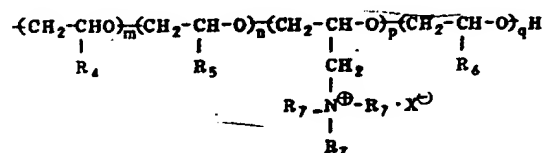
The reason is as follows. When the average molecular weight is lower than 2000, the hair's finishing effect is not displayed, and the purpose of this invention cannot be realized. On the other hand, if the average molecular weight is over 30,000, not only is the hair's finishing effect poor, but also it becomes water-insoluble, so that the appearance degrades and the commercial value decreases.

The amount of polypeptide in the cosmetic composition should be in the range of 0.1-30%. If the content is less than 0.1%, the hair finishing effect is poor. On the other hand, if the content is over 30%, water-insolubility becomes insufficient, and the commercial value and appearance degrade.

On the other hand, according to this invention, cellulose ether containing quaternary nitrogen as a necessary component is the compound represented by the following formula. Its content in the cosmetic composition should be in the range of 0.05-5%.



where, R_1, R_2, R_3 represent H or a substituent represented by



which can have different $R_4, R_5, R_6, R_7, m, n, p, q$.

Here, m, n, q represent integers of 0-10; p represents an integer of 0-3; R_4, R_5, R_6 represent H or CH_3 ; R_7 represents $\text{CH}_3, \text{C}_2\text{H}_5$ or C_3H_7 ; X represents a halogen; and l represents an integer in the range of 100-20,000.

Also, the average value of $(m + n + q)$ for each glucose unit is in the range of 1-3, and the average value of p should be in the range of 0.1-0.8, or preferably in the range of 0.2-0.5.

Examples of the commercial names of cellulose ether containing quaternary nitrogen preferred for this invention include Polymer JR-125, Polymer JR-400 and Polymer JR-30M manufactured by Union Carbide Co.

For the cosmetic composition of this invention, in addition to the aforementioned necessary components, that is, polypeptide and cellulose ether containing quaternary nitrogen, it may also contain other components conventionally contained in general-purpose shampoos, hair rinses, hair treatments, etc., such as surfactants, oil-base components, lecithin, solvents, perfumes, bactericides, dyes, chelating agents, UV absorbers, inorganic electrolytes, water-soluble polymers, etc., in appropriate amounts corresponding to the specific application.

The cosmetic composition of this invention has significantly better finishing effect for hair than the conventional hair cosmetic products.

Polypeptide and cellulose ether containing quaternary nitrogen as necessary components form a composite salt with a powerful adsorptivity on the hair surface. Coating can hardly flow off in a water rinse, and an appropriate moisture retentivity can be displayed.

In the following, the effects of this invention will be explained in detail with reference to application examples.

In the application examples, the hair finishing effect was evaluated with respect to setting ease of hair, combing ease and dynamic friction coefficient, together with tests of the appearance of the commodity.

○ Setting ease

Hair is processed with the cosmetic composition, and with a commercially available product as control, evaluation is performed by 20 testers using the pair-comparison method.

The grades of evaluation are as follows.

++: Setting is easier than with the commercially available product

+: Setting is slightly easier than with commercially available product

±: Setting is equal to the commercially available product

○ Combing ease

It is evaluated in the same way as the setting ease of hair.

○ Dynamic friction coefficient

After a strand of hair is treated with the cosmetic composition, the dynamic friction coefficient is measured with a friction coefficient meter.

○ Appearance of commodity

After the cosmetic composition is stored for 1 month under prescribed conditions, the appearance is evaluated with the naked eye. That is, X indicates the case when separation or precipitation or the like takes place and the commercial value decreases. Otherwise, it is indicated with ○.

Application Example 1, Comparative Examples 1-5

As listed in Table 1, polypeptide and quaternary cellulose ether were added to a mixture system composed of 10% sodium polyoxyethylene (3 mol) lauryl ether sulfate, 5% diethanolamide of coconut oil fatty acid, and 0.1% disodium edetate, followed by adding refined water as the balance to form a shampoo composition. The obtained shampoo composition was used to form a 6% aqueous solution for washing hair, followed by rinsing of the hair well with water.

Table 1

		③					⑤
		比較例1	比較例2	比較例3	比較例4	比較例5	実施例1
① 成分	③ 液体パラフィン		2				
	⑥ レシチン			2			
	ポリペプチド *1 ⑦				2		1
	第4級置換含有セルロースエーテル *2 ⑧					2	1
	⑨ ポリオキシエチレン(3モル)ラウリルエーテル硫酸ナトリウム	10	10	10	10	10	10
	⑩ ヤシ油脂肪酸ジエタノールアミド	5	5	5	5	5	5
	⑪ エデト酸二ナトリウム	0.1	0.1	0.1	0.1	0.1	0.1
	⑫ 精製水	残	残	残	残	残	残
② 試験	⑬ 毛髪の手とまり易さ	±	±	±	±	±	+
	⑭ 毛髪の手通り易さ	±	±	±	±	±	++
	⑮ 毛髪の手擦係数	0.7	0.7	0.7	0.7	0.7	0.3

⑬ 注) *1 : 平均分子量 10000

*2 : ポリマー JR-400

- Key: 1 Composition (%)
 2 Tests
 3 Comparative Example
 4 Application Example
 5 Liquid paraffin
 6 Lecithin

- 7 Polypeptide *1
- 8 Cellulose ether containing quaternary nitrogen *2
- 9 Sodium polyoxyethylene (3 mol) lauryl ether sulfate
- 10 Diethanolamide of coconut oil fatty acid
- 11 Disodium edetate
- 12 Refined water
- 13 Setting ease of hair
- 14 Combing ease of hair
- 15 Dynamic friction coefficient of hair
- 16 Balance
- 17 Notes)

*1: Average molecular weight of 10,000

*2: Polymer JR-400

As can be seen from Table 1, when liquid paraffin, lecithin, polypeptide and other additives for hair finishing effect in the prior art, as well as cellulose ether containing quaternary nitrogen are contained separately, no hair finishing effect is displayed. On the other hand, for the cosmetic composition in Application Example 1 which meets the condition defined in this invention, that is, when both a polypeptide with an average molecular weight of 10,000 and cellulose ether containing quaternary nitrogen are used, the hair finishing effect can be improved significantly.

Application Examples 2-7, Comparative Examples 6-10

As listed in Table 2, a polypeptide and cellulose ether containing quaternary nitrogen were added to a mixture system composed of 10% lauryl ethanolamine, 5% diethanolamide of fatty acid, 1% sodium chloride, and 0.1% disodium edetate, followed by adding refined water as the balance to form a shampoo composition.

Table 2

		(3)	(4)	(4)	(4)	(3)	(3)	(3)	(4)	(4)	(4)	(3)
成分		比較 例 6	実施 例 2	実施 例 3	実施 例 4	比較 例 7	比較 例 8	比較 例 9	実施 例 5	実施 例 6	実施 例 7	比較 例 10
		10 _{0.3}	10 _{0.4}	10 _{0.5}	10 _{0.6}	10 _{0.7}	—	005 _{0.6}	01 _{0.8}	10 _{0.8}	30 _{0.8}	35 _{0.8}
①	ポリペプチド (5)											
	第4級窒素含有 セルロースエーテル (6)	1	1	1	1	1	1	1	1	1	1	1
	ラウリルアルコール硫酸 トリエタノールアミン (7)	10	10	10	10	10	10	10	10	10	10	10
	脂肪酸ジエタノールアミド (8)	5	5	5	5	5	5	5	5	5	5	5
	塩化ナトリウム (9)	1	1	1	1	1	1	1	1	1	1	1
②	エデト酸二ナトリウム (10)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	精製水 (11)	残	残	残	残	残	残	残	残	残	残	残
	毛髪の手とまりめさ (12)	±	+	++	++	+	±	±	+	++	++	++
	毛髪の手通りめさ (13)	±	++	++	++	+	±	±	+	++	++	++
	毛髪の手摩擦係数 (14)	0.65	0.3	0.2	0.2	0.4	0.7	0.65	0.4	0.2	0.2	0.2
③	商品外観 (15)	○	○	○	○	×	○	○	○	○	○	×
	①⑦	注) *3: 平均分子量 1000 *4: 平均分子量 2000 *5: 平均分子量 5000 *6: 30000 *7: 40000 *8: 10000										

- Key: 1 Composition (%)
 2 Tests
 3 Comparative Example
 4 Application Example
 5 Polypeptide
 6 Cellulose ether containing quaternary nitrogen
 7 Triethanolamine lauryl sulfate
 8 Diethanolamide of fatty acid
 9 Sodium chloride
 10 Disodium edetate
 11 Refined water
 12 Setting easiness of hair
 13 Combing ease of hair
 14 Dynamic friction coefficient of hair
 15 Appearance of commodity
 16 Balance
 17 Notes)

- *3: Average molecular weight of 1000
 *4: Average molecular weight of 2000
 *5: Average molecular weight of 5000
 *6: Average molecular weight of 30,000
 *7: Average molecular weight of 40,000
 *8: Average molecular weight of 10,000

As can be seen from Table 2, in Comparative Example 6, in which polypeptide with average molecular weight of 1000 is added, no hair finishing effect is obtained. In Comparative Example 7, in which the average molecular weight of the polypeptide is over 40,000, although a slight hair finishing effect is observed, the appearance of the commodity degrades. Consequently, this is undesired. On the other hand, in Application Examples 2-4, in which the average molecular weight of the polypeptide is in the range of 2000-30,000, a significant hair finishing effect is observed, and the appearance of the commodity is also good.

In addition, as far as the amount of polypeptide added is concerned, if the amount is over 0.1%, the hair finishing effect is observed. On the other hand, if the amount is over 30%, as can be seen from Comparative Example 10, it is insoluble in a water-base composition, and the appearance of the commodity is undesired.

Application Examples 8-9, Comparative Examples 11-12

Polypeptide and cellulose ether containing quaternary nitrogen were added to a mixture system composed of 3% stearyltrimethylammonium chloride, 10% propylene glycol and 10% ethanol, followed by adding refined water as the balance to form a hair rinse. The performance was evaluated, with results listed in Table 3.

Table 3

		③	③	④	④
		比較例 11	比較例 12	実施例 8	実施例 9
① 成分	ポリペプチド ** ⑤	—	1	0.5	3
	第4級窒素含有 セルロースエーテル ⑥	—	—	0.5	1
	ステアリルトリメチル アンモニウムクロライド ⑦	3	3	3	3
	プロピレングリコール ⑧	10	10	10	10
	エタノール ⑨	10	10	10	10
② 試験	精製水 ⑩	残	残	残	残
	毛髪のまとまり易さ ⑪	±	±	+	++
	毛髪の通り易さ ⑫	±	±	+	++
	毛髪の動摩擦係数 ⑬	0.3	0.3	0.2	0.15

⑮ 注) **: 平均分子量 10,000

- Key: 1 Composition (wt%)
 2 Tests
 3 Comparative Example
 4 Application Example
 5 Polypeptide *9
 6 Cellulose ether containing quaternary nitrogen
 7 Stearyltrimethylammonium chloride
 8 Propylene glycol
 9 Ethanol
 10 Refined water
 11 Setting ease of hair
 12 Combing ease of hair
 13 Dynamic friction coefficient of hair
 14 Balance
 15 Notes)
 *9: Average molecular weight of 10,000

As can be seen from Table 3, in Comparative Example 12, in which a polypeptide is added, hair finishing effect only equal to that of the commercially available product as Comparative Example 11 is displayed. On the other hand, for the hair rinse products prepared in

Application Examples 8 and 9, in which a polypeptide and cellulose ether containing quaternary nitrogen are added, a better hair finishing effect is displayed.

Application Examples 10-11, Comparative Examples 13-14

A hair treatment of preshampoo type was prepared, and its performance was studied.

Polypeptide and cellulose ether containing quaternary nitrogen were added to a mixture system composed of oil-base components including 20% of 100-sec liquid paraffin, 2% of Vaseline, 2% stearyl alcohol, and 2% glycerol monostearate, an emulsifying agent composed of 3% polyoxyethylene (average EO addition molar number of 10) and 0.5% sodium palmitate, and a water layer component made of 5% glycerol, followed by adding refined water as the balance. For the obtained hair treatment, the performance was tested.

Table 4

		③	③	④	④
		比較例 13	比較例 14	実施例 10	実施例 11
① 成分	ポリペプチド *10 ⑤	—	1	0.5	1
	第4級塩基含有 セルロースエーテル ⑥	—	—	0.5	1
	流動パラフィン ⑦	20	20	20	20
	ワセリン ⑧	2	2	2	2
	ステアリアルアルコール ⑨	2	2	2	2
	グリセリンモノステアレート ⑩	2	2	2	2
	ポリオキシエチレン(平均EO 付加モル数10)セチルエーテル ⑪	3	3	3	3
	パルミチン酸ソーダ ⑫	0.5	0.5	0.5	0.5
	グリセリン ⑬	5	5	5	5
	精製水 ⑭	残	残	残	残
② 試験	毛髪のもたまりあさ ⑮	±	±	+	++
	毛髪のかゆみあさ ⑯	±	±	+	++
	毛髪の動揺減少率 ⑰	0.3	0.3	0.2	0.1

⑭ 注) *10 : 平均分子量 10000

- Key: 1 Composition (wt%)
 2 Tests
 3 Comparative Example
 4 Application Example
 5 Polypeptide *10
 6 Cellulose ether containing quaternary nitrogen

- 7 Liquid paraffin
 - 8 Vaseline
 - 9 Stearyl alcohol
 - 10 Glycerol monostearate
 - 11 Polyoxyethylene (average EO additive molar number of 10) cetyl ether
 - 12 Sodium palmitate
 - 13 Glycerol
 - 14 Refined water
 - 15 Setting ease of hair
 - 16 Combing ease of hair
 - 17 Dynamic friction coefficient of hair
 - 18 Balance
 - 19 Notes)
- *10: Average molecular weight of 10,000

As can be seen from Table 4, for the hair treatment in Comparative Example 14 in which polypeptide alone is added, the hair finishing effect is only equal to that of the conventional hair treatment in Comparative Example 13. On the other hand, for the hair treatments in Application Examples 10 and 11, which contained both a polypeptide and cellulose ether containing quaternary nitrogen, the hair finishing effect is improved significantly.